Science and Art elementary paper is contained on p. 73 under the heading of "How to construct chemical equations." The expression "two thicknesses of blue glass" might be more explicit, and the same may be said of the term "injurious" applied to an excess of barium chloride. Many of the pages are unnumbered, and there are numerous misprints. J. B. C.

Elements of Physics. By Ernest J. Andrews and H. N. Howland; to which is added a Manual of Experiments. Pp. xi+386+53. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1903.) Price 6*s*.

THE aim of the writers has been to present an account of physics suitable for secondary schools. With this aim in view, they have avoided everything of a purely academic character—with the exception of "little bits of history" which they make a point of inserting. The book is of a very elementary character, and is almost completely free from any mathematics except the simplest arithmetic. More attention is paid to a delivery of the facts with which a pupil is expected to be acquainted than with formal proofs of the relations between them. The authors' methods may be indicated by the constant recurrence of the two phrases "it is evident" and "just as." The latter phrase shows the reliance placed on the method of analogy; the former phrase sometimes means *it is easily proved by simple experiments*—and suitable experiments are then described; sometimes it appears to be used merely to help over a difficult point. Great emphasis is laid on a pupil learning a thing by observation, and this is as it should be. An adequate course of introductory experiments is given in the "Manual."

In general, the explanations given are clear and sufficiently accurate. It is true that the man who is clothed with the love of accuracy as with a garment will not take much pleasure therein. But there is a rapidly growing class of students—the product of county scholarships, &c.—who, owing to imperfect mental training, require knowledge to be served up in a simple if even somewhat loose way; and these requirements deserve to be satisfied.

In a few places there are unfortunate slips. The reference to "permeability" on p. 183 is quite misleading—it is confused with "retentivity." Again, in connection with the liquefaction of gases, it is explained how a little liquid air may liquefy a lot; this savours of the monthly magazines. These misconceptions should be cleared up in a future edition.

First Steps in Photo-Micrography. By F. Martin Duncan. Pp. 104. (London: Hazell, Watson and Viney, Ltd., 1902.) Price 1*s*. net.

THIS little work is intended, as its title implies, to be a guide for those who are beginners in a fascinating branch of photography. It is avowedly written for photographers, and not for microscopists, so that much that is passed over may be excused. The apparatus stated to be necessary is such that good work may be accomplished even with moderately high powers.

The tendency has been of late to advise beginners to attempt some photomicrographic work with the most meagre appliances, thereby increasing their difficulties at the beginning.

It is satisfactory to note that in this little book simple yet efficient appliances are advised. The portion devoted to the illumination of objects, perhaps the most important part of the whole subject, is treated all too briefly, but in other respects the book may be recommended to those who are commencing photomicrography, as a useful guide which will materially assist them in their earliest efforts.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Radio-active Gas from Well Water.

I HAVE recently found that water from deep wells in Cambridge contains a radio-active gas, and I am anxious to see whether water from other sources possesses the same property. I should be greatly obliged if any of your readers who have access to deep level water would fill a clean two-gallon can with it and forward it to the Cavendish Laboratory. I should, of course, pay the carriage and return the can. I may say that I have already had samples of water from Birmingham and Ipswich, each of which contained the gas. J. J. THOMSON.

Cavendish Laboratory, Cambridge, April 25.

Can Dogs Reason?

DR. HILL has recently asked the question, "Can dogs reason?" The following analogy has always appeared to me to be a sufficient reply. In ordinary circumstances, few human beings make use of their sense of smell; to excite it, the odour must be fairly strong, and also unusual. It may be regarded as probable that few dogs make habitual use of any power of inference, but have only vague sensory impressions, to which an almost automatic response is given. Yet under sufficient stimulus, they may perform acts involving an exertion of a considerable amount of "thought." Whereas, then, dogs rarely "think," but frequently make use of their delicate sense of smell, human beings seldom make use of that sense, but constantly exercise their reasoning faculties.

Again, is not the opening of a box somewhat akin to the exercise of an inventive faculty? Teach a man how to operate a complicated machine of which he does not understand the mechanism, and it may be doubted whether he will connect the process of setting it in motion with some desire to gain an advantage which is not obviously attained by doing so.

I am tempted to describe an occurrence which reveals in a dog which I have at present the possession of two rather rare qualities of mind for a dog. One is the accumulation of brightly coloured objects. This dog sleeps on a mat in a basket. On taking out the mat to clean it, a strange collection of articles is generally neatly arranged below it; I remember, for instance, large pieces of red sealing-wax attached to strings, a comb, a piece of whalebone, a Brussels sprout, some lumps of coal showing pyrites, a polished dry rib bone, some kindling sticks with resin, &c. These objects had not been gnawed, but merely placed under the mat as valued possessions.

Again, this dog has a keen sense of a joke. Some days ago, a small dog with a loose chain was wandering in the garden. Its owner came out and called it. My dog caught the chain, dragged the little dog away, and waited events. As soon as the owner approached, the small dog was dragged out of reach, and it was not until after a long chase that the little dog was captured. These small incidents show, I think, that it is as impossible to classify all dogs together as it is to classify human beings; their minds naturally run in very different directions, and, just as there are inventive or artistic men, so dogs may show leanings towards special developments of their minds. WILLIAM RAMSAY.

Bullfinch and Canary.

THAT a bullfinch can be trained to pipe a whole tune, or more, to perfection, that is to say, do it, so far as intonation and rhythm are concerned, as well as any skilled musician, everybody knows. It is also a fact, though perhaps less common, that a canary, placed in an adjoining room and hearing the tune of such a piping bullfinch over and over again, may, quite by himself, *i.e.* without being trained for it, acquire the same accomplishment to the minutest detail.

An experience, however, which I have had during *a*

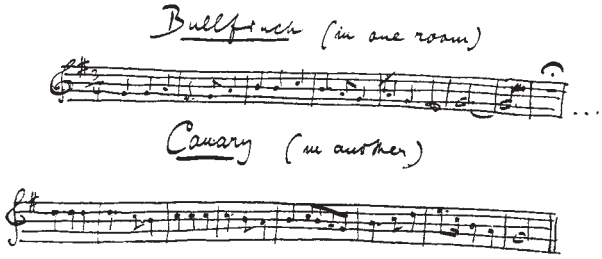
recent visit to Germany has so greatly impressed my friend Prof. Hubrecht of Utrecht, to whom I told it, that I venture to think you will find it of sufficient interest to be laid before your readers.

My sister, Frau Prof. Grosse of Brunswick, possesses an old bullfinch which pipes, among other tunes, "God Save the King" beautifully, even embellishing it now and then with some charming little gracenotes. For some time he was the only bird in the house, until, about a year ago, my sister received the present of a canary bird, a lovely but untrained songster, singing, as they say in Germany, "as his beak was grown."

The cages containing the two birds stood in two adjoining rooms. At first one of the birds would be silent when the other was singing. Gradually however the young canary bird commenced to imitate the tune of the bullfinch, trying more and more of it at a time, until after nearly a year's study he had completely mastered it, and could pipe it quite independently by himself. As I said before, this, in a canary bird, though a rare accomplishment, is nothing very extraordinary or unheard of.

Now, however, I come to my point. What I am going to relate seems to me so wonderful that I should consider it absolutely incredible had I not with my own ears heard it, not once, but dozens of times within the few days of my visit.

When the bullfinch, as sometimes happened, would, after the first half of the tune, stop a little longer than the rhythm of the melody warranted, *the canary would take up the tune where the bullfinch had stopped*, and properly finish it. This, then, is what I heard :—



I should be glad to read in a further issue of your paper whether you share my astonishment, or if any of your readers can perhaps recall, or have ever heard of, a similar experience.

GEORGE HENSCHEL.

Kensington, April.

Mendel's Principles of Heredity in Mice.

IN NATURE of March 19 Mr. Bateson refused to discuss the eye-colour of Mr. Darbishire's mice as a simple character, separable from coat-colour. He then treated Mr. Darbishire's results as dependent on gametes of two kinds; one, G, bearing the characters "white coat and pink eye," the other, G′, bearing "colour in the coat and pink eye." The hybrids resulting from the cross were said to be of constitution GG′, and their offspring were represented, in constitution and in relative frequency, by

$$GG+2GG'+G'G'.$$

Hybrids are here represented as producing gametes of two kinds only, each kind like that of one pure race; eye-colour and coat-colour are transmitted together in one unresolved "allelomorph." The mice in any one of the three groups are said to be formed from similar pairs of gametes, and they should themselves be similar; but they are not. The colour in the coat of a mouse GG may be yellow, or some shade of wild-colour, or black; that of a mouse G G′ may be yellow, fawn, or "lilac."

In NATURE of April 23 Mr. Bateson abandons his first formula; he now says (1) that more than two kinds of gametes take part in the first crosses, since the gametes of one or both pure races are heterogeneous; (2) that coat-colour is split into simpler elements when the hybrids form gametes. The heterogeneity of gametes in two races, both of which breed true, while one has been declared by Mr. Bateson to be universally recessive, is a doctrine too amazing for brief treatment; I therefore consider only the second of the new assumptions.

The hypothesis of March 19, invoking only two kinds of gametes, supposes that one out of every four offspring of hybrids will be a recessive albino, and this is not contradicted by the facts: but the hypothesis regards black and yellow coat-colour as produced by identical pairs of gametes. The new hypothesis provides different gametic elements for the black and for the yellow mice, but it reduces the number of "recessive" albinos among the offspring of hybrids to a *maximum* of one in *nine*. The two "Mendelian predictions" which Mr. Bateson has so far uttered *ex post facto* are mutually contradictory; with which of them is the inheritance of coat-colour "in punctilious agreement"?

Oxford, April 24. W. F. R. WELDON.

The Discovery of Japan.

FROM a review in NATURE of November 13, 1902 (vol. lxvii, p. 28), I gather Herr Hans Haas, like many other writers on Japan, considers Ser Marco Polo the first who brought any news of Japan to the west. In this connection, it will be interesting to note that in his "Six Voyages," Paris, 1676, Tavernier tries to identify a local name of the classic geographers, *Jabadi*, if I remember correctly, with the ancient vernacular designation of the empire, *Yamato*, or rather with its Chinese rendering, *Yamadai* or *Jabatai*.

Whether this identity be true or not, it is almost certain that Japan was well known to the mediæval Arabs much prior to Marco Polo. In a French translation of the "Voyages of the Two Arabs in the Ninth Century," an island near China is mentioned the inhabitants of which used to send a tribute to the latter, in the firm belief that it would make their own country peaceful. This island seems to point to Japan, the story being apparently a version of the legend, recorded in Wang Chung's "Lun Hang," first century A.D., that under Ching-Wang of the Chau dynasty (*c.* 1100 B.C.), China enjoyed such an extraordinary peace that it caused even the winds and waves in the neighbouring States to be perfectly calm, on which account the people of Laos gave him thanks by their envoys, who reached the capital after several years' journey, and the Japanese made him presents of the Salty Herb (now supposed to mean the *Angelica Kiusiana*, Maximowicz). The "Second Annals of Japan" mentions several Arabs, including women, passing into or becoming settled in Japan during the eighth and ninth centuries. This is no wonder, for, in those ages, China under the grand dynasty of Tang was so prosperous and powerful that nearly all Asiatic peoples of significance vied in asking her favours, and they saw each other very frequently in that empire; besides, doubtless there were many Japanese who passed through China into the lands then called her territories or tributaries; thus, Twan Ching-Shih, in his "Miscellany," written ninth century A.D., speaks of his meeting with a Japanese priest, who came back from his travels in India, where he witnessed the figures of the famous Chinese pilgrim, Hiuen-Tsiang, revered in the Buddhist churches. Indeed, the "Second Annals" relates how, in the year 753 A.D., the Japanese ambassador was successful in a dispute with the Arabian about the first seat of honour on occasion of a state banquet on the New Year's Day. Add to these, in the "Hokuhen Zuihitsu," written eighteenth century, it is argued that in the Middle Ages there were mutual acquaintances between the Japanese and the Persians.

When we see in the sixteenth and seventeenth centuries (in part) the Spaniards and Portuguese flourishing in the Japanese ports under the native appellation *Namban*, or South Barbarians, it is very striking to find in a memoir evidently written in the fifteenth century, entitled "The Successions of Governors of a County in Wakasa" (in Hanawa's "Collection," ed. 1894, p. 375), the following passage :—

"June 22, 1408. A vessel of the Nambans arrived (in the province of Wakasa). Their emperor's name is Arekishinkei, and the envoy's Mongwan-hon-a. His Majesty's presents to the Japanese emperor were a living black elephant, a mountain-horse (*sic*), two pairs respectively of the peafowl and parrots, and various other articles. The ship was wrecked by a storm, and stranded on November 18, but, after being reconstructed, started for China on October 1, 1409."